LITTLE BLUE BOOK NO. 568
Edited by E. Haldeman-Julius

Darwin and the Theory of Evolution

Carroll Lane Fenton

LITTLE BLUE BOOK NO. 568
Edited by E. Haldeman-Julius

Darwin and the Theory of Evolution

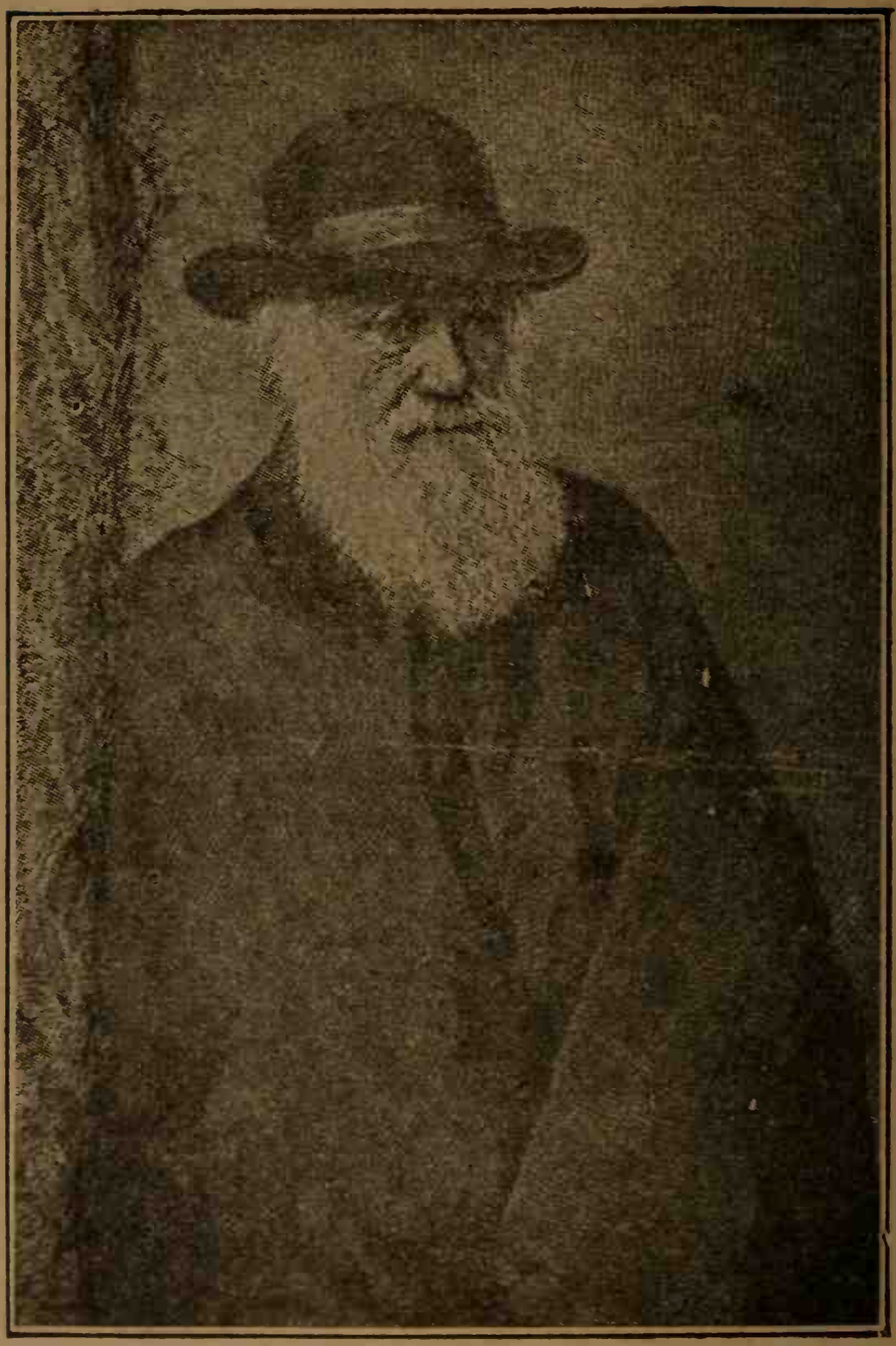
Carroll Lane Fenton

HALDEMAN-JULIUS COMPANY
GIRARD, KANSAS

Copyright,
Haldeman-Julius Company

PRINTED IN THE UNITED STATES OF AMERICA

DARWIN AND THE THEORY OF EVOLUTION



CHARLES DARWIN

INTRODUCTION

Although eminent in the fields of geology, botany, and systematic zoology, Charles Darwin's chief fame rests upon his part in the development of the theory of organic evolution. For decades this theory was considered to be almost inseparable from the man and his work; even today there are thousands of people who know nothing of it except as it is associated with Darwin. Their conception of evolution may be true, it may be partly true, or it may be as false as the combined forces of ignorance and distortion can make it; yet to them it is "Darwinism," to be accepted, tolerated, or attacked, as the case may be. What evolution may have been without Darwin it is useless to speculate; what its rate of progress would have been there is no need to wonder. The mere fact that there were no men of Darwin's generation who accomplished what he accomplished is enough to show that the theory would have had to wait decades had he been lacking. And that alone is enough to establish the importance of his work.

So we shall begin this volume with a study of his relation to, and his influence on, the theory of organic descent. Such an inquiry, compressed into fewer than three score pages obviously cannot do full justice to the subject, nor can it add a great deal that has not already been said in more pretentious criticisms. But it can ask, however, two questions that often are slighted, and by stressing the answers to them, give a background for further work. The first of these questions is, how much did Darwin owe to those who studied and speculated before him; the second, by what course of inquiry and thought did he arrive at his final position with regard to the origin and development of living things?

DARWIN AND THE THEORY OF EVOLUTION

CHAPTER I

THE ORIGIN OF SPECIES

Darwin owed more to the early workers in evolution than generally is admitted, or he himself supposed. To an even greater extent he paralleled the work of his predecessors, many of whose books he had not even read. Thus even the theory of natural selection was published while Darwin still believed in special creation, although the mention of it was buried in a huge volume of timber suitable for naval construction.

This does not, of course, show that Charles Darwin lacked originality, or that his work lacked merit. Man began to wonder about the origin of living things long before he had the slightest inkling of either science or philosophy, and it is only natural that the more he knew the more he would speculate about that which he did not know. The early speculations, which dealt with gods rather than with animals or plants, soon were subjected to scrutiny along with the facts that they attempted to explain. Twenty-four centuries before the birth of Darwin, the Greek philosopher Thales taught that all life originated in the sea, and developed in accordance with natural law rather than the wills of the gods. In the eighteenth century, Goethe, Erasmus Darwin, and Geoffroy St.

Hilaire came quite independently to the conclusion that species were not permanent, and each offered some explanation of the process of change. Following them came Lamarck, a leader of the French anti-creationists, who published, between the years of 1800 and 1815, a series of books, whose great thesis was that every living thing, including man himself, was descended from some earlier, and in most cases simpler living thing. These books attracted much attention, especially because of the opposition which they aroused, and undoubtedly did much to prepare continental Europe for the coming of evolution.

Inasmuch as Lamarck was the foremost evolutionist to precede Darwin, it is worth while to know what influence he may have exerted, and what his ideas were. In the first place, he saw clearly that species were not distinct units, as the earlier naturalist has supposed. Instead, they were more or less artificial definitions, applied to animals and plants that constantly varied, and among which there often was almost perfect graduation from one group to another. In addition, Lamarck saw that the domesticated species were not constant, and could be changed at will, even though they maintained fairly uniform distinctions. In explaining changes in form, color, and so on, he supposed that there was a very close correlation between the characters of a plant or animal and the conditions of its life, the circumstances of crossing with other species, and by habits causing an increase or decrease of certain parts—all underlain by a universal tendency for perfection. According to Lamarck, the giraffe has

a long neck because his ancestors used their necks to reach food, while the snake lacks legs because his ancestors crawled on their bellies until their legs disappeared. This was the theory of "inheritance of acquired characters"—a theory sponsored by Darwin's grandfather, and which even today is far from being settled either favorably or otherwise.

So far as we can tell, Lamarck did not go far to convince Charles Darwin that species were the product of natural forces, nor did he furnish much material for the young naturalist's study. Indeed, it seems probable that Darwin did not read Lamarck's books in the original French, for he had great difficulty with the language. This, perhaps, accounts for the slighting and even contemptuous references to the books which one may find in several of the letters. In the second edition of the *Journal of Researches*, he describes a South American animal, whose habits resemble those of the mole, and which frequently is blind, and comments, "Considering the strictly subterannean habits of the Tucutuco, the blindness, though so common, cannot be a very serious evil .... Lamarck would have been delighted with this fact had be known it when speculating (probably with more truth than usual with him) on the gradually *acquired* blindness of the Aspalax, a gnawer living underground, and of the Proteus, a reptile living in dark caverns filled with water, in both of which animals the eye is in an almost rudimentary state, and is covered with a tendinous membrane of skin. . . . no doubt Lamarck would have said that the Tucutuco was passing into the state of

Aspalax and Proteus." In another letter he describes his work on evolution to Hooker, and adds, "Heaven forefend me from Lamarck nonsense of a 'tendency to progression,' 'adaptations from the slow willing of animals,' etc!"

There is, of course, the possibility that by reading Lamarck, and noting his obvious errors, Darwin was stimulated to seek more facts, and better bases for interpreting them. When he first read the *Zoonomia*, the principal evolutionary work of his grandfather, he was not greatly impressed. Yet in his later judgment of this book, he says, "Nevertheless, it is probable that the hearing, rather early in life*, such views maintained and praised, may have favored my upholding them in a different form in my Origin of Species." It would not be hard to include Lamarck with Erasmus Darwin in this acknowledgment.

It is plain, therefore, that Darwin was acquainted with the general conception of the evolution of life some years before he went upon the *Beagle* as naturalist. That he did not consider the idea as either probable or even suggestive of truth is shown by his own statement that, while on the voyage, he accepted the Bible literally, and along with it, the theory of special creation. But the reading of Lyell's *Principles of Geology*—in which Lamarck's hypotheses are quite fully explained—and the study of similarities between living and fossil forms in South America combined to bring about uncertainty, and in the end, a complete

*Darwin was eighteen when he learned of Lamarck, and even younger when he read *Zoonomia*.

change of opinion. Thus in 1834, though still a believer in special creation, he was able to explain various facts only by admitting that species gradually became modified and, in his own words, "the subject haunted" him. Yet he was so unwilling to accept the evidence of his own observation that, in 1839, he sent his *Journal* to the printer with numerous references to special creation, and no mention of another explanation that seemed to him far more satisfactory.

Darwin seems to have accepted the idea of evolution, some time in 1836 or early in 1837, for he opened his first notebook in July of the latter year. Concerning his method he says, "I worked on true Baconian principles, and without any theory collected facts on a wholesale scale, more especially with respect to domesticated productions, by printed inquiries, by conversation with skillful breeders and gardeners, and by extensive reading. When I see the list of books of all kinds which I read and abstracted, including whole series of Journals and Transactions, I am surprised at my industry. I soon perceived that selection was the keynote of man's success in making useful races of animals and plants. But how selection could be applied to organism living in a state of nature remained for some time a mystery to me."

The reading and abstracting continued for fifteen months before Darwin found an answer to his question as to how a method of selection akin to that practiced by the breeder might be carried out among creatures not tampered with by man. While reading Malthus' now

famous essay on Population* the idea came that, inasmuch as the struggle for food and other necessities of life was just as pressing among all other organisms as among man, there was a ready explanation of the means by which a purely natural selection could be carried on age after age, without the slightest necessity for guidance by some superior intellect. Under such conditions it would be only natural that the favorable variations would tend to be preserved, while the unfavorable ones were destroyed. The result of this would be the formation of new species. "Here then," says Darwin, "I had at last got a theory by which to work; but I was so anxious to avoid prejudice, that I determined not for some time to write even the briefest sketch of it. In June, 1842, I first allowed myself the satisfaction

---

*Thomas R. Malthus was an English clergyman who wrote on subjects of political economy. His most famous work, and the one which so aided Darwin is titled, *Essay on the Principles of Population as it Affects the Future Improvement of Society,* and was published in 1798. Malthus believed that "population unchecked goes on doubling itself every twenty-five years—or increases in geometrical ratio. The rate according to which the productions of the earth increase must be totally of a different nature from the ratio of the increase of population. . . . The power of propagation being in every period so much superior (to that of production), the increase of the human species can only be kept down to the level of the means of subsistence by the constant operation of the strong law of necessity, acting as a check on the greater power."

It is easy to see how this exposition applied to the problem on which Darwin was working, and the assistance it must have given him.

of writing a very brief abstract of my theory in pencil in 35 pages; and this was enlarged during the summer of 1844 into one of 230 pages, which I had fairly copied out and still possess.

"But at this time I overlooked one problem of great importance; and it is astonishing to me, except on the principle of Columbus and his egg, how I could have overlooked it and its solution. This problem is the tendency in organic beings descended from the same stock to diverge in character as they become modified. That they have diverged greatly is obvious from the manner in which species of all kinds can be classed under genera, genera under families, families under sub-orders and so forth; and I can remember the very spot in the road, whilst in my carriage, when to my joy the solution occurred to me; and this was long after I had come to Down. The solution, as I believe, is that the modified offspring of all dominant and increasing forms tend to become adapted to many and highly diversified places in the economy of nature."

It was at about this time that Darwin began to feel real confidence in the results of his reading and experimentation. In January of 1844, before writing out the second statement of his ideas, he wrote to Hooker:

. . . I have now been, ever since my return, engaged in a very presumptuous work, and I know no one individual who will not say a foolish one. I was so struck with the distribution of the Galapagos organisms, etc., and with the character of the American fossil mammifers, etc., that I determined to collect, blindly, every sort of fact, which could bear in any way on what are species. I have

read heaps of agricultural and horticultural books, and have never ceased collecting facts. At last gleams of light have come, and I am almost convinced (quite contrary to the opinion I started with) that species are not (it is like confessing a murder) immutable. . . I think I have found out (here's presumption!) the simple way by which species become exquisitely adapted to various ends. You will now groan, and think to yourself, 'on what a man I have been wasting my time and writing to.' I should, five years ago, have thought so. . . .*

This was the first time Darwin mentioned the subject to Hooker—or for that matter, to anyone outside of his own household. But the great botanist neither groaned nor regretted the time he had spent in writing; instead, he accepted the earliest possible invitation to meet Darwin at his brother's house in London. After that Hooker frequently came to Down, sometimes alone, and sometimes in the company of other naturalists. After the work of evolution became well established, visits became matters of scientific inquiry as well as friendship.

"It was an established rule," says Hooker, "that he every day pumped me, as he called it, for half an hour or so after breakfast in his study, when he first brought out a heap of slips with questions botanical, geographical, etc., for me to answer, and concluded by telling me of the progress he had made in his

*Here we have a conflict in dates. It is plain that Darwin did not trouble to decide definitely at what time he did begin to believe in evolution, or to admit its possibility, and the various dates depend upon the varying viewpoints from which he considered his attitude at the time he wrote.

own work, asking my opinion on various points. I saw no more of him till noon, when I heard his mellow ringing voice calling my name under my window—this was to join him in his daily forenoon walk round the sand-walk.* . . . our conversation usually ran on foreign lands and seas, old friends, old books, and things far off to both mind and eye."

Even after writing out his conclusions on the development of life, and the conditions underlying evolution, Darwin was not ready to publish. There were more facts to collect, and minor theories to verify, and he was unwilling to have his work appear before it was so complete as to be quite convincing. At the same time he realized that there was chance of his death, in which case the results of those years of patient labor might be lost, or used imperfectly. The following letter, written on July 5, 1844, and addressed to Mrs. Darwin, tells how highly the manuscript was prized:

> I have just finished my sketch of my species theory. If, as I believe, my theory in time be accepted even by one competent judge, it will be a considerable step in science.
>
> I therefore write this in case of my sudden death, as my most solemn and last request, which I am sure you will consider the same as if legally entered in my will, that you will devote 400 pounds to its publication. . . . I wish that my sketch be given to some competent person, with this sum to induce him to take trouble in its improvement and enlargement. I give to him all my books on

*See the account of the Home at Down, in "Darwin As a Naturalist," No. 567 in this Series.

Natural History, which are either scored or have references at the end of the pages, begging him carefully to look over and consider such passages as actually bearing, or by possibly bearing, on this subject. I wish you to make a list of all such books as some temptation to an editor. I also request that you will hand over to him all those scraps, roughly divided in eight or ten brown paper portfolios. The scraps, with copied quotations from various works are those which may aid my editor. . . As the looking over the references and scraps will be a long labour, and as the *correcting* and enlarging and altering my sketch will also take considerable time. I leave this sum of 400 pounds as some remuneration, and any profits from the work. I consider that for this the editor is bound to get the sketch published either at a publisher's or his own risk. . . .

With respect to editors, Mr. Lyell would be the best if he would undertake it; I believe he would find the work pleasant, and he would learn some facts new to him. As the editor must be a geologist as well as a naturalist, the next best editor would be Professor Forbes of London. The next best (and quite best in many respects) would be Professor Henslow. Dr. Hooker would be *very* good. . . . Should one other hundred pounds make the difference of procuring a good editor, request earnestly that you will raise 500 pounds.

This letter gives us, aside from a glimpse of the value which Darwin gave his "sketch," an interesting estimation of his various scientific friends, so far as their connection with evolution was concerned. The estimate changed in time, for ten years later another notation was made on the letter, reading, "Hooker by far best man to edit my species volume. August, 1854."

Fortunately Darwin's ill health, though painful and hampering in the extreme, did not seriously threaten his life, and there was no need

to follow out the directions of the letter. The work of reading, observing, and experimenting, went on year after year. The puzzling problem of variation among animals and plants yielded to a solution—not a complete one by any means, yet one that was sufficient for the time. The concept of selection grew in importance, until it became the principal feature of the work. Yet as the information accumulated the magnitude of the problem became more clear, and Darwin still hesitated to publish what he considered an incomplete statement of the question and its answer.

During these years of investigation, general interest in the beginning and development of life increased. The same year that Darwin wrote his much-prized sketch, there appeared an anonymous book called the *Vestiges of Creation*, which some people attributed to Darwin. The book was written in a brilliant style, but particularly in the earlier editions, contained a great number of inaccuracies. As Darwin wrote Hooker, "his geology strikes me as bad, and his zoology far worse," while the general tone of the book was far from philosophic. Yet it did expound *an* idea of evolution, even though a poor one, and had a very large sale. Even Darwin, devotee to accuracy and caution, admitted that the book did great service in calling attention to the subject, in removing a great deal of prejudice, and in preparing the popular mind for other and more accurate information in the same field.

Finally, in 1856, Lyell persuaded Darwin to prepare his work for publication, and he be

gan work on a scale that would have resulted in three or four volumes the sizes of the Origin of Species. The project was brought to a sudden halt, however, when in 1858 Alfred Russell Wallace, then a young man living in the Malay Archipelago, sent Darwin a manuscript entitled *On the Tendency of Varieties to Depart Indefinitely from the Original Type.* The matter was placed before Lyell and Hooker, who advised that, inasmuch as Darwin had been at work on his theory of species long before Wallace, it was only fair that steps should be taken to give proper credit for his pioneer work. Darwin objected to this, and was willing to leave Wallace the entire field, but his friends would not hear to it.

As a result of their persuasion, Lyell and Hooker sponsored the publication, in the *Journal of the Linnean Society* for June 30, 1858, a group of papers, including two short ones by Darwin* and Wallace's essay. With these went a statement as to the work done by each author, establishing clearly the priority of Darwin. The papers, however, did not attract much attention, for Darwin says, ". . . the only published notice of them which I can remember was by Professor Haughton of Dublin, whose verdict was that all that was new in them was false, and what was true was old."

In spite of the great similarity of ideas, as

---

*One of these papers was a mere extract from Darwin's larger manuscript; the other was an abstract of a letter to Dr. Asa Gray, an American botanist. The whole took up a little more than six pages.

shown by their papers, Darwin and Wallace differed considerably in the attitude from which they approached and regarded the problem. As Dr. Osborn points out, "Darwin dwells upon *variations in single characters*, as taken hold of by Selection; Wallace mentions variations, but dwells upon *full-formed varieties*, as favorably or unfavorably adapted. It is perfectly clear that with Darwin the struggle is so intense that the chance of survival of each individual turns upon a single and even slight variation. With Wallace, Varieties are already presupposed by causes which he does not discuss, a change in the environment occurs, and those varieties which happen to be adapted to it survive." Needless to say, of the two methods of approach, that of Darwin is by far the more thorough-going.

Wallace resigned the work in favor of Darwin, who in 1858 set to work upon a book on the development of species, but was so interrupted by illness that more than a year was necessary to complete it. In the main it was a condensation of the work begun in 1856 and interrupted by the arrival of Wallace's paper—a condensation which Darwin did not desire, but undertook in order to prevent further difficulty in matters of priority, and to gratify his friends. Throughout the period of the work there are references to it in his letters—here the refusal to read a "heavy" book until the work on the "Abstract" is done—there a wish that the work would be completed, so he could rest. On January 25th, 1859, Darwin wrote Wallace, ". . . thank God I am in my last chapter but one," while on March 2d he asked Hooker

if he could look over the chapter on Geographical Distribution. There is an amusing note to a letter of March 28, where Darwin asks Lyell:

> Would you advise me to tell Murray (his publisher) that my book is not more *un*-orthodox than the subject makes inevitable. That I do not discuss the origin of man. That I do not bring in any discussion about Genesis, etc., etc., and only give facts, and such conclusions from them as seem to me fair.
>
> Or had I better say nothing to Murray, and assume that he cannot object to this much unorthodoxy, which in fact is not more than any Geological Treatise which runs slap counter to Genesis.

Evidently Mr. Murray did not have great doubts as to lack of orthodoxy—nor as to the probable sale of the book, for a few days later Darwin wrote, ". . . I wrote him and gave him the headings of the chapters, and told him he could not have the MS. for ten days or so; and this morning I receive a letter offering me handsome terms, and agreeing to publish without seeing the MS.! So he is eager enough. . . ." Later on, three sample chapters were sent to Murray, who confirmed his acceptance of the book. The work of writing and copying went on, and various chapters were sent to specialists for comment and, if necessary, correction. There was much difficulty with style, and even Mrs. Hooker assisted in making corrections. Even after the manuscript went into the hands of the printer corrections were necessary after the material was "set up" in type. Probably Darwin became more and more dissatisfied as the work went on and his health became worse, for on June 22d he wrote Hooker, ". . . .how can a man have anything to say, who spends every day in correcting accursed proofs; and such

proofs! I have fairly to blacken them, and fasten slips of paper on, so miserable have I found the style. You say you dreamt that my book was *entertaining;* that dream is pretty well over with me...." But gradually the work lessened; on September 30th the last of the regular pages were finished, and only the index remained to be done. It appears that it was handled by someone else, for in the same letter Darwin mentions the practical completion of the book and the plan to go to a hydropathic hospital on "Tuesday or Wednesday." When the next letters were written the *Origin of Species* was finished, and its author had spent a couple of weeks in rest. To him it was neither a great book, nor even a well-done one; after thirteen months of exacting labor he could see little in it that another could not have done with more success. Yet, even with his knowledge of its incompleteness and imperfections, Darwin was glad it was written—and impatiently eager for it to appear and meet the judgment of those who had taken no part in its production.

CHAPTER II

THE WAR OVER SPECIES

Darwin's diary, under the date of October 1, 1859, bears the entry, "Finished proofs (thirteen months and ten days) of Abstract on 'Origin of Species'; 1,250 copies printed. The first edition was published on November 24th, and all copies sold first day." On the 9th of December he and his family returned home from a visit to a water-cure establishment; the only later entry in the diary is, "During end of November and beginning of December, employed in correcting for second edition of 3,000 copies; multitude of letters."

There is a great deal implied in those two brief entries—more, even, than Darwin himself appears to have realized. In the first place, it is very unusual for an entire edition of a scientific book, even when that edition is only 1,250 copies, to be exhausted the day it appears. It is still more unusual for a second edition, nearly two and a half times as great as the first, to be called for within a month. Such things generally happen to but two classes of books: those that are very bad, such as most popular novels, and those that are almost unbelievably good. It is characteristic of the former that they are received with enthusiasm and acclaim; of the latter that they are welcomed by a few, suspected yet considered by many, and attacked by the majority of those who read them as well as by an equal or greater number who don't. And this is particu-

larly true when the substance of the really great book is also the substance of long established tradition and prejudice, and the conclusions drawn are such as to contradict or seriously modify other conclusions reached thouands of years before, and cherished dearly by the greater part of the human race.

Darwin was prepared for scepticism, disbelief, and attack, yet it is doubtful if he realized the magnitude of the upheaval that his book would cause. Even before the *Origin* officially was published the discussion began, for the paper of 1858 had aroused much interest. Everyone at all interested was impatiently waiting for the complete book; those who were on terms of friendship with the author, or had helped him in the work, received copies in advance. Of these Huxley in particular knew what was to come, perhaps with the instinct of a born fighter. On November 23, the day before the Origin of Species was put on sale, he wrote Darwin:

> I trust you will not allow yourself to be in any way disgusted or annoyed by the considerable abuse and misrepresentation which, unless I greatly mistake, is in store for you. Depend upon it you have earned the lasting gratitude of thoughtful men. And as to the curs which will bark and yelp, you must recollect that some of your friends, at any rate, are endowed with an amount of combativeness which (though you have often and justly rebuked it) may stand you in good stead.
>
> I am sharpening my claws and beak in readiness.

Reviews of the book began to appear in December, and continued in steadily increasing numbers. Some of them were favorable, such as the one three and a half columns long,

which Huxley got into the London *Times*. Others were tolerant, but more were opposed. As Huxley warned, there was to be a great barking and yelping, not from scientific opponents alone, but from great religious groups who knew hardly the first essentials of biology, and cared little more than they knew. Thus in February of 1860 Darwin wrote his friend Hooker, "The stones are begining to fly. But Theology has more to do with these two attacks than Science...." It was not long before almost every letter bore a reference to some review in which the critic had grossly misunderstood or wilfully distorted passage after passage of the *Origin*. In June the naturalist wrote Lyell that he was "weary of reviews."

The storm broke with full fury, however, at the June meeting of the British Association for the Advancement of Science, held at Oxford. On Thursday, June 28, there was an argument between Owen, the anatomist, and Huxley, in which the whole audience took sides. Owen was dogmatic and Huxley firm, even though he refrained from making any real attack on the opponents of Darwin. On Friday there was quiet—the quiet before a storm. Every one knew that the two factions would come to battle, and almost every one wanted to take part. All that was needed was an excuse.

That came on Saturday, when Dr. J. W. Draper* of New York, an evolutionist and mili-

*The author of *A History of the Conflict Between Religion and Science*, a book which, though nearly half a century old, contains a more thorough study of the subject from this particular angle than does any other work in English.

tant agnostic, read a paper on the "Intellectual development of Europe considered with reference to the views of Mr. Darwin." The paper itself appears not to have possessed any great importance, but several of the statements which Dr. Draper made, and the conclusions which he drew made the religious faction in the Association furious. The Bishop of Oxford announced that he would speak upon the theory of descent, and the fight was on.

The excitement was tremendous.* The Lecture Room, in which it had been arranged that the discussion should be held, proved far too small for the audience, and the meeting adjourned to the Library of the Museum, which was crammed to suffocation long before the champions entered the lists. The numbers were estimated at from 700 to 1000—a huge attendance for the British Association. Had it been during session of the University, or had the general public been admitted, it would have been impossible to have accommodated the rush to hear the oratory of the bold Bishop. Professor Henslow, who was president of the section, held the chair, and wisely announced at the beginning that none who had not valid arguments to bring forward on one side or the other would be allowed to address the meeting—a caution that proved necessary, for no fewer than four combatants had their utterances burked by him, because of their indulgence in vague declamation.

The Bishop was up to time, and spoke for fully half an hour with inimitable spirit, emptiness, and unfairness. It was evident from his handling of the subject that he had been "crammed" up to the throat, and that he knew nothing at first hand; in fact, he used no argument not to be found in his "Quarterly" article. He ridiculed Darwin badly, and Huxley savagely, but all in such dulcet tones,

*The following account is paraphrased from the several given by Francis Darwin, *Life and Letters*, vol. 2, pp. 114-116 (American Edition).

so persuasive a manner, and in such well-turned periods, that I who had been inclined to blame the President for allowing a discussion that could serve no scientific purpose now forgave him from the bottom of my heart. Unfortunately the Bishop, hurried along on the current of his own eloquence, so far forgot himself as to push his attempted advantage to the verge of personality in a telling passage in which he turned round and addressed Huxley whether he was related by his grandfather's or his grandmother's side to an ape.

Huxley's reply was nearly as forceful and eloquent as was the attack of the Bishop, and much more firmly grounded in scientific knowledge. In concluding, he came to the Bishop's question about ancestry, and delivered a keen rejoinder. "I asserted," he said, "And I repeat, that a man has no reason to be ashamed of having an ape for his grandfather. If there were an ancestor whom I should feel shame in recalling, it would be a *man*, a man of restless and versatile intellect, who, not content with an equivocal success in his own sphere of activity, plunges into scientific questions with which he has no real acquaintance, only to obscure them by aimless rhetoric, and distract the attention of his hearers from the real point at issues by eloquent digressions, and skilled appeal to religious prejudice."

The excitement was then at its height. A woman fainted and had to be carried out, men gesticulated and shouted at each other. Fitz-Roy, Darwin's old friend, rushed about brandishing a bible and trying to make impassioned appeals to the authority of "The Book".* Finally things quieted down so that discussion

*Poulton, Darwin and the Origin of Species, p. 66.

could be resumed. Several of the members called for Hooker, the botanist and co-worker of Darwin, and Henslow invited him to give his view of the theory from the side of botany. Hooker complied willingly, showing that, by his own statements the Bishop had not understood even the simpler principles of Darwinism, and at the same time was thoroughly ignorant of the elementary facts of botany. The Bishop made no reply, so the meeting broke up.

Accounts of the meeting reached Darwin promptly, and on Sunday he wrote Hooker congratulating him for his triumph over the Bishop, and recognizing his own inability to take part in public arguments. A little later he expressed himself to Huxley, "From all I hear from several quarters, it seems that Oxford did the subject great good. It is of enormous importance, the showing the world that a few first-rate men are not afraid of expressing their opinion."

Such was the beginning of the scientific-religious war which for more than sixty years has raged with varying degrees of fury over the idea that one species arises from another. It spread throughout the civilized world—indeed, was in full progress in the United States at the time of the Oxford meeting, and the countries of continental Europe were reached a little later, when translations began to appear. For a time the opposition was conducted in part, at least, by scientists, who thought they could see real scientific reasons to advance against those set forth by Darwin. But gradually this party died out—and died off—

and the field was left to the religious group. But they, too, found themselves in difficulty. Not a few of the older, and therefore more reactionary theologians went the way of the older and more reactionary naturalists. They were replaced by younger men who, in spite of their training, were somewhat tolerant of the new ideas of the century. Not a few of them even possessed some knowledge of biology, so they set about the process of reconciling what they believed with what they, or their betters, knew. This was not extremely difficult; the old doctrine of theology was ready and, with a little remodeling, applied excellently. Evolution ceased to be a contradiction of God, and became merely his way of doing things. What Darwin himself thought of this idea, and the unreasoning dogmatisms to which it often leads, is shown in a later chapter, *Darwin and the Gods.*

There were, of course, plenty of irreconcilables. The Catholic Church would make no compromise with fact, when that fact in any way detracted from the finality of Catholic dogma. Other sects, without the power and dignity of the Church of Rome possessed even more virile enthusiasm for ancient creeds and writings of doubtful authority. Captain Fitz-Roy was not the only one who insisted on the authority of "The Book"; his cry was taken up by the majority of the Protestant sects. The leaders of this group, being as ignorant of evolution as was the Bishop of Oxford, did not hesitate to ascribe to that theory all manner of properties and implications which it did not possess. Indeed, it furnished them with a

ready explanation for all evils—political, social, economic, and religious, or rather, anti-religious. Did a new and not particularly desirable philosophy spring up, a social system give evidence of decay, or the Christian church show alarming signs of becoming as defunct as Zoroastrianism, these gentlemen had the true cause at their finger tips. That cause was the iniquitous Mr. Darwin, who believed that one species of plant-louse could arise from another without the intervention of God the Almighty.

And so the war goes on. German Kultur, Bolshevism, weakening morals of educated people—these and many other scarecrows are the latest to be put in the witness box against Darwin, his followers, and even those scientists who oppose him. Willful ignorance and distortion of facts continue, and orators go from state to state, and even nation to nation, urging people to use their political power to do away with the teaching of so wicked a doctrine as the origin of species. Indeed, under the impetus of reactionaries who, dull as they are, perceive the extinction which threatens them and their kind, the war against fact is becoming more fierce than almost ever before. Perhaps the legal steps taken by the opposition will succeed for a time, at least; perhaps they will meet well-deserved failure. At any rate, those who are inclined to deny that evolution, mental or physical, progresses at an almost unbelievably slow pace, may do well to consider these facts: In 1923, sixty-four years after Darwin published the Origin of Species an American legislature voiced its attitude by opposing books in which the theory of evolution

was even mentioned. And in 1922, four hundred thirty years after Columbus reached America, and four hundred years after Magellan's ship made the first circuit of the globe, a teacher in an Indiana school was threatened with discharge for telling her pupils that the earth was not flat, but round.

CHAPTER III

THE DESCENT OF MAN, AND OTHER BOOKS

When Darwin wrote the *Origin of Species* he considered it as little more than an abstract or outline of the subject, to be followed by a series of larger books giving in full the evidence for evolution which he possessed. One of these, "*Variations of Animals and Plants under Domestication*," he began on January 1, of 1860—less than six weeks after the publication of the *Origin*—but could not get on with it very rapidly. This partly was because of the great deal of work necessary to correct the successive editions of the *Origin*, but even more because of illness. At one time Darwin was unable to do anything for seven months, and shorter periods of disability were common. Also, conditions had shown that scientists were having trouble enough comprehending the preliminary book on evolution, so there was no pressing need for a series of larger treatises for a while, at least.

But perhaps the most important factor of all in the delay of the larger books was the great accumulation of data on lines other than evolution, which Darwin felt it his duty to publish. Thus as far back as 1839 he had begun to study the part which insects played in the cross-fertilization of flowers. Every summer he had devoted time to that work, and the accumulation of twenty years of investigation lay on his hands—valuable, indeed, yet doing no good

to anyone but himself. Plainly, therefore, it was his duty to publish this material, so that it could be examined by other naturalists and used by them in making still further researches.

Thus it was that in 1862 appeared the *Fertilization of Orchids*,* which two years later was described as the most masterly treatise in any branch of vegetable physiology that had appeared. The group of plants which it treated are remarkable for the devices by which they provide for cross-fertilization by means of the insects which visit them. These provisions were skilful enough in the English forms, but in foreign ones, and particularly those from tropical and semi-tropical countries, the mechanisms were still more highly developed. Thus Darwin found that among one group the various parts of the flower were so accurately developed for cross-fertilization that without the aid of insects not a single plant in the whole group of twenty-nine genera could produce seed. In most cases the insects which come to the flowers for food withdraw the pollen masses only when retreating from the blossom, and, by going to another plant or flower effect a union between the two. Commonly the pollen masses slowly change position while attached to the insects, so as to assume the position proper to contact with the stigma of another flower. During the time necessary for this change the insect almost certainly flies to another plant, so that the necessary cross is accomplished.

---

*The full title is, *On the Various Contrivances by Which Orchids Are fertilised by Insects.*

The *Orchid* book was Darwin's first venture into botany and it established his position there as other books had established it in geology and zoology. In 1864 he published a paper on Climbing Plants—an effort which cost him four months of labor. Again illness interfered, and the paper was so badly written, and so obscurely phrased that it received little attention. Eleven years later it was rewritten into a book and became very popular.

In 1868 the first volume of the detailed studies of evolution appeared. Of it Darwin says, "It was a big book, and cost me four years and two months hard labour. It gives all my observations and an immense number of facts collected from various sources, about our domestic productions. In the second volume the causes and laws of variation, inheritance, etc., are discussed as far as our present state of our knowledge permits. Towards the end of the work I give my well abused hypothesis of Pangenesis." This, briefly stated, supposes that the countless cells which compose the body of an animal or plant are continually throwing off tiny granules, far too small to be seen even microscopically, that accumulate in the reproductive system. Instead of developing in the next generation they may be transmitted in an inactive or dormant state to several generations, and then suddenly become developed. Various combinations of these granules are supposed to influence their appearance or dormancy in the various generations. As a hypothesis Pangenesis was suggestive but not very satisfactory when put to practice, and

it has been discarded in favor of later and more probable ideas.

The next important evolutionary work was the *Descent of Man*, published in February, 1871. Inasmuch as there is some misunderstanding as to the motive which forced Darwin to say but little of man in the *Origin*, and delay twelve years before publishing a book on the subject, it is worth while to give his own statement of the case:

. . . As soon as I had become, in the year 1837 or 1838,* convinced that species were mutable productions, I could not avoid the belief that man must come under the same law. Accordingly I collected notes on the subject for my own satisfaction, and not for a long time with any intention of publishing. Although in the *Origin of Species* the derivation of any particular species is never discussed, yet I thought it best, in order that no honourable man should accuse me of concealing my views, to add that by the work "light would be thrown on the origin of man and his history." It would have been useless and injurious to the success of the book to have paraded, without giving any evidence, my convinction with respect to his origin.

But when I found that many naturalists fully accepted the doctrine of the evolution of species, it seemed to me advisable to work up such notes as I possessed, and to publish a special treatise on the origin of man. I was the more glad to do so, as it gave me an opportunity of fully discussing sexual selection—a subject which had always greatly interested me. This subject, and that of the varia-

---

*There may be some doubt about the extent of Darwin's conviction at that time. Certain it is that his *Journal of Researches*, edition of 1839, contains several references to special creation, as is shown in "Darwin as a Naturalist," No. 567, in this Series.

tion of our domestic productions, together with the causes and laws of variation, inheritance, and the intercrossing of plants, are the sole subjects which I have been able to write about in full, so as to use all the materials which I have collected. The *Descent of Man* took me three years to write, but then as usual some of this time was lost by ill health, and some was consumed by preparing new editions and other minor works.

The Descent of Man created an even greater popular stir than did the *Origin*. The large first edition was quickly sold out; and discussion and ridicule of the book became the fashionable recreation for those who had read parts of it as well as those who had not. The comic paper *Punch* acted as a mirror of current opinion, which in the main was adverse. One of the Darwin ballads* calls to mind more recent things of the same sort in connection with the discovery of great fossil animals in our own country:

They slept in a wood,
Or wherever they could
For they didn't know how to make beds;
They hadn't got huts,
They dined upon nuts,
Which they cracked upon each other's heads.
They hadn't much scope
For a comb, brush, or soap,
Or towels, or kettle, or fire;
They had no coats nor capes,
For ne'er did these apes
Invent what they didn't require.

. . . . .

From these though descended,
Our manners are mended,
Though still we can grin and backbite;
We cut up each other,
Be he friend or brother,

*Quoted by Bettany, *Life of Darwin*, p. 124.

And tails are the fashion—at night.
This origination
Is all speculation—
We gamble in various shapes;
So Mr. Darwin
May speculate in
Our ancestors having been apes.

The main contention of Darwin, that man was developed from a lower stock, and so on back to the beginning of life, is too well known today to deserve a great deal of comment. How much natural selection may have affected that development cannot yet be said with certainty —there are too many other possible factors of which we are just beginning to learn. In that time, however, it was less known, and even more apt to excite prejudice. The mere conclusion that the minds of man and the lower animals were very similar was enough to set the theologians agog with excitement; to them it was a direct thrust at the "godliness" of the human intellect.

Indeed, the preachers did have cause for alarm. Not only was Darwin's general conclusion as to man's ancestry at direct variance with the tenets of "revealed" religion; some of his statements contradicted the strongest arguments on which religion is based. He sees no evidence that it had played, in the remote past, any important role in the development of humanity. "There is no evidence," he says, "that man was aboriginally endowed with the ennobling belief in the existence of an omnipotent God." This was not, of course, a proclamation of atheism or agnosticism; it was not even a question as to the truth of the conception of a god, or of gods. Yet it would cause others to

question, to examine the bases for their beliefs, and perhaps even to give some of them up. Of course, one might give up a great many beliefs and still be a Christian, a Mohammedan, or what not, but he could not be orthodox. And it was orthodoxy upon which the preachers depended for their power—or, in many cases, for their jobs.

But the most emphasized, if not the most important, feature of the *Descent of Man* was the section dealing with Darwin's hypothesis of sexual selection. This hypothesis held that animals of one sex held a definite preference for certain qualities in the opposite sex. Naturally, under this supposition, the predominant number of matings would be with those individuals possessing the favored characteristics, so that in time those qualities would become established. Thus among birds the more brilliant males, or those with superior voices, were the more successful in courtship, and so left more descendants than did the unfavored ones. Eventually the advantageous coloration would be established as the character of the species, or of a new species.

This hypothesis (it hardly deserves to be called a theory) became extremely popular with the followers of Darwin. It seemed to explain a great number of things, and required only a small acquaintance with the subject and an ordinary amount of common sense to manipulate. Evolutionists actually hunted for multiple examples of favorable characters; the most insignificant features of appearance or structure were assumed to be aids in the struggle for existence. From the arguments of these

enthusiasts one would gain the idea that there were no traits in animals that were either useless or harmful, but that every structure and habit had been carefully selected with regard to their usefulness. For a while evolutionists, and particularly amateur evolutionists, made a fad of sexual selection, and the more significant features of Darwin's work were slighted.

But the hypothesis contained a great weakness—it depended too much on the accuracy of the human mind as a gauge of the animal mind. It supposed that the thoughts of a man, looking upon the gorgeous plumage of a cock pheasant, were akin to those of the hen pheasant. It made possible the explanation of altogether too many things, and on a basis for which there was but the slightest psychological support. To hold that the minds of a beetle, a bird, an elephant, and a man were similarly affected by similar things was going too far, particularly when there was no way of proving the stand, or of testing it by experiment. Gradually sexual selection lost popularity, and in the reaction dragged with it the theory of natural selection. Indeed, though careful experiments in breeding have demonstrated too clearly for question the efficiency of selection, the part which selection, of whatever kind, played in evolution is far from settled. As Dr. A. F. Shull, one of the leaders among the younger zoologists of America, recently wrote, "There is no marked inclination among leading biologists to attribute to selection in nature, through the struggle for existence, anything but a minor and negative role in evolution."

In the years following 1874 Darwin wrote sev-

eral books, and in 1879 he supervised the publication of an English version of Dr. Ernst Krause's *Life of Erasmus Darwin*, adding a sketch of the poet-evolutionist's habits and character. But people were too much interested in the ideas of a living Darwin to devote much thought to those of a dead member of the same family, and fewer than a thousand copies of the book sold.

In 1881 the aged naturalist published his last book, *The Formation of Vegetable Mould, Through the Action of Worms.* More than forty years before he had written a preliminary sketch of the subject, and in December of the year he moved to Down he had begun an experiment which was to contribute greatly to the study. Twenty-nine years later, November, 1871, the experiment was completed. Darwin proved that bits of chalk and of harder rock could, in a period of three decades, be buried more than half a foot by the action of earthworms alone. Observations on the buried ruins of Roman towns of Britain showed that their condition was due largely to the action of these same earthworms, which year after year brought earth to the surface in the form of castings. Of the further work in this problem Mr. Bettany says:

> Earthworms were not only scrutinized in their out-of-door work, but were kept in confinement and studied. It appears that they swallow earth both to make their burrows and to extract all nutriment it may contain; they will eat almost anything they can get their skin over. From careful calculation it was shown that worms on an average pass ten tons of soil on an acre of ground through their bodies every year. It is, then, but a truism to say

that every bit of soil on the surface of the globe must have passed through their bodies many times. They were discovered to work mainly by night, when hundreds may with care be discerned, with tails fixed in their burrows, prowling round in circles, rapidly retreating into holes, and strongly resisting efforts to extract them. It was found . . . that they have no sense of hearing, but a most remarkable sensitiveness to vibrations of the earth or even to contact with air in motion.

This book which, like the others achieved a great and unexpected popularity, left Darwin exhausted. "I feel so worn out that I do not suppose I shall ever again give reviewers trouble," he wrote Hooker. Yet for several months he worked on, not with enthusiasm nor with the hope of carrying out another large project, yet with interest. In March and April, 1882, he felt poorly, and the action of his heart became so weak that he was unable to climb the stairs. On April 18 he was well enough to examine a specially interesting plant which had been brought him, but on the following day he died.

CHAPTER IV

DARWIN AND THE GODS

It is a strange thing that Darwin, whose work has exerted the most profound influence on religious thought, neither wrote or said much on the subject. This was true in spite of the fact that, like most thoughtful people, he had religion often in mind, and had definite ideas regarding it. Darwin saw himself as a scientist, and a scientist only; he felt wholly at sea in matters of technical philosophy and theology. Apparently it did not occur to him that religion really had no need of high-sounding technicalities, and that a man could get quite as far by using common sense alone as by using common sense wrapped up in big words, and hollow formulæ. He knew that he lacked specialized training in fields of abstract thought, and therefore he considered his views on religion as being "of no real consequence" to anyone but himself.

That was a safe position, and perhaps a very just one, yet we are in no way obliged to adopt it. If for no other reason than to form a correct picture of the man, we should inquire as to his attitude on such subjects as gods, revelation, and teleology. Probably there is no better way to conduct this inquiry than to trace, as well as we can, the development of Darwin's opinion, from the time when he first began to analyze his belief to the time when he last stated it.

Darwin began, as did most of us, by accepting literally the English Bible, placing a child's faith in an all-powerful and all-seeing God, who could create worlds or help small boys get to school on time, just as the occasion demanded. By the time he left Edinburgh he had progressed far enough to question some things in the creed of the Church of England, and this caused some hesitation when his father urged him to go to Cambridge and become a preacher. But even then he did not question a word of the Bible, so that when he found an admirably written book, which showed, quite skillfully, that the dogmas of the church also were the "everlasting truths" of Christianity, his doubts were settled. That placid orthodoxy lasted almost throughout the *Beagle* voyage; the young man even got himself laughed at by the ship's officers for quoting the Bible as infallible evidence in argument.

But the large number of things seen on the world-trip could not fail to undermine orthodox faith, and particularly the orthodox faith of a young man fond of thinking things out for himself. Less than three years after his return to England he had come to the conclusion that the Old Testament was no more reliable than the sacred books of the Hindus. That admission brought another flood of doubts, this time about the New Testament. If there was a god, interested in the good of the Hindus, would he make a new revelation and permit it to be linked up with the old Hindu gods and heroes, as the revelation of Jesus is connected with the Old Testament and its obvious falsehoods. Would the bearer of this new revelation

believe in those ancient mythological characters? Such a condition was incredible, and so Christianity as well as Judaism went by the board.

"By further reflecting," says Darwin in his autobiography, "that the clearest evidence would be requisite to make any sane man believe in the miracles by which Christianity is supported—and that the more we know of the fixed laws of nature the more incredible do miracles become—that the men at that time were ignorant and credulous to a degree almost incomprehensible by us—that the Gospels cannot be proved to have been written simultaneously with the events—that they differ in many important details, far too important, as it seemed to me, to be admitted as the usual inaccuracies of eye-witnesses;* by such reflections as these, which I give not as having the least novelty or value, but as they influenced me, I gradually came to disbelieve in Christianity as a divine revelation. The fact that many false religions have spread over large portions of the earth like wild-fire had some weight with me.

"But I was very unwilling to give up my belief; I feel sure of this, for I can well re-

*It is interesting to note how the later researches in this field have proved that the gospels were not written in Jesus' time. On the other hand, the most recent studies seem to have established the fact that Jesus (probably named Joshua) *did* live, —which appears to be questioned by Darwin in the next paragraph. The best discussion of this problem is to be found in Professor Case's book, *The Historicity of Jesus*, published by the University of Chicago Press, Chicago.

member often and often inventing day-dreams of old letters between distinguished Romans, and manuscripts being discovered at Pompeii or elsewhere, which confirmed in the most striking manner all that was written in the Gospels. But I found it more and more difficult, with free scope given to my imagination, to invent evidences which would suffice to convince me. Thus disbelief crept over me at a very slow rate, but was at last complete. The rate was so slow that I felt no distress.

"Although I did not think much about the existence of a personal God until a considerably later period of my life, I will here give the vague conclusions to which I have been driven. The old argument from design in Nature, as given by Paley, which formerly seemed to me so conclusive, fails, now that the law of natural selection has been discovered. We can no longer argue that, for instance, the beautiful hinge of a bivalve shell must have been made by an intelligent being, like the hinge of a door by man. There seems to be no more design in the variability of organic beings, and in the action of natural selection, than in the course the wind blows....*

---

*This same argument of design in evolution, and in all the universe, for that matter, is very popular today, particularly among naturalists and theologians who manage to believe in Jehovah and Darwin at the same time, and make a reconciliation of their beliefs. It is essentially a religious argument, or conception, and assumes a purpose,—a divinely guided, and *good* purpose in all things. One of the greatest defects of its followers is that they think nothing can be good, or valuable, or progressive, unless planned for. It is this error which leads them into such absurd positions as that of

Darwin then admits, and even goes out of his way to prove that pleasure exceeds suffering in the living world. Yet he does not underestimate the role of pain in life; his objection is

---

Dr. Edwin Grant Conklin, a famous evolutionist, when he says: "If a man is the result of unintelligent forces and processes; . . . if men are born by millions only to be swept away by flood, famine, pestilence, and war; if they live and die like the beasts and leave only their bones and implements behind; if suffering and struggle are purposeless and lead to nothing—if this really were the teaching of evolution, then certainly it would be true that evolution debases man and destroys the hopes of mankind. But this is not true and it is not the teaching of evolution, but rather of pessimism and atheism.

"The blighting influence of atheism (with which Dr. Conklin seems to include agnosticism) is shown in just such conclusions as those mentioned, for it substitutes blind chance and necessity for plan and purpose, both in nature and in human life. If there is no teleology in nature, the course of evolution leading to man and to consciousness is the result of blind and blundering accident. If there is no purpose or value in human labor and suffering, life is not worth living."

It is such rhetorical generalizations as this, made by men who plainly know next to nothing about either atheism or agnosticism; who mistake prejudice for fact; who set up scarecrows of their own half superstitious imaginations for the joy of shooting them down; who even appear unable to separate two into one and one.—it is such generalizations, broadcasted from public platforms and university chairs, that help make clear thinking almost an impossibility in college "educated" circles. Indeed, those men almost make us admit the truth of their bugaboo picture as to the worthlessness of humanity, and agree with another biologist who has said that, "The evolution of consciousness is the greatest blunder in the universe." Surely no earthworm would tie himself into such a knot as does Dr. Conklin—and then be proud of it. C. L. F.

to a teleological interpretation of the universality of suffering. "Some," he says, "have attempted to explain this with reference to man by imagining that it serves for his moral improvement. But the number of men in the world is as nothing compared with that of all other sentient beings, and they often suffer greatly without any moral improvement. This very old argument from the existence of suffering against the existence of an intelligent First Cause seems to me a strong one; whereas, as just remarked, the presence of much suffering agrees well with the view that all organic beings have been developed through variation and natural selection.

"At the present day the most usual argument for the existence of an intelligent God is drawn from the deep inward conviction and feelings which are experienced by most persons.

"Formerly I was led by feelings such as those just referred to (although I do not think that the religious sentiment was ever strongly developed in me) to the firm conviction of the existence of God and the immortality of the soul. .... This argument would be a valid one if all men of all races had the same inward conviction of the existence of one God; but we know that this is very far from being the case. Therefore I cannot see that such inward convictions and feelings are of any weight as evidences of what really exists. The state of mind which grand scenes formerly excited in me, and which was intimately connected with a belief in God, did not essentially differ from that which is often called the sense of sub-

limity; and however difficult it may be to explain the genesis of this sense, it can hardly be advanced as an argument for the existence of God, any more than the powerful though vague and similar feelings excited by music.

"With respect to immortality, nothing shows me (so clearly) how strong and almost instinctive a belief it is, as the consideration of the view....that the sun with all the planets will in time grow too cold for life, unless indeed some great body dashes into the sun, and thus gives it fresh life. Believing as I do that man in the distant future will be a far more perfect creature than he now is, it is an intolerable thought that he and all other sentient beings are doomed to complete annihilation after such long-continued slow progress. To those who fully admit the immortality of the human soul, the destruction of our world will not appear so dreadful."

It is worthy of note, however, that Darwin did not let even this feeling, or prejudice; he wished he could believe in immortality, rather envied those who could, but maintained his own doubt. The same is true of his attitude on the problem of conceiving the universe, or the great group of universes, as the result of purely impersonal, unintelligent, natural forces. "When thus reflecting," he says, "I feel compelled to look for a First Cause having an intelligent mind in some degree analogous to man; and I deserve to be called a Theist. This conclusion was strong in my mind about the time, as far as I remember, when I wrote the 'Origin of Species'; and it has since that time, with many fluctuations, become weak-

er. But then arises the doubt, can the mind of man, which has, as I fully believe, been developed from a mind as low as that possessed by the lowest animal, be trusted when it draws such grand conclusions?

"I cannot pretend to throw the least light on such abstruse problems. The mystery of the beginning of all things is insoluble by us; and I for one must be content to remain an Agnostic."

Such is Darwin's position with relation to the problem of the existence or non-existence of a god. He flatly denies the existence of a personal deity, so far as his belief or knowledge goes. Nor does he have any desire to reconcile science and any form of religion, even that of his own country. "Science and Christ* have nothing to do with each other, except in so far as the habit of scientific investigation makes a man cautious about accepting any proofs. As far as I am concerned I do not believe that any revelation has ever been made with regard to a future life; every one must draw his own conclusions from vague and contradictory probabilities."

---

*In modern usage, probably the equivalent of Jesus. Among the real critics of religion great care is being taken to use "Jesus" only as applying to the *man; "Christ"* is restricted to the religious legend and office which is associated with him. Thus one may believe thoroughly in the existence of Jesus while he disbelieves just as thoroughly in the existence of a Christ.

CHAPTER V

THE PERSONALITY OF DARWIN

Throughout "Darwin as a Naturalist," No. 567 in this series, we considered Charles Darwin primarily as a man—a boy, a youth, a father, a friend, as well as a scientist. In the present book we considered him rather as a worker, a philosopher, a student, and have for the time ignored, or at least slighted, the human side of him. And now, having viewed the more material angles of the man—for even natural philosophy is, to a considerable extent material, we may well consider him as a personality, and a personality alone. Just what kind of a man was Charles Darwin? How did he respond to praise and react to opposition? What was there about him that made friends and, on the other hand, occasionally made bitter enemies? How might he have impressed us, had we been able to meet him?

Appearance—feature, action, and even dress—plays a considerable part in personality, even if it serves as little more than a handy index for the casual observer. Darwin's face, however, is too well known to need description, and so we may pass at once to his action. He was a large man, about six feet in height, but looked less because of a stoop which increased much with age. He walked with a loose, swinging step that often was maintained with a good deal of effort, and used a heavy, iron-tipped stick when outside. Indoors, however, his step was often slow and weak, with the feet planted

heavily, as though each movement was an effort. "When interested in his work he moved about quickly enough, and often in the middle of dictating he went eagerly into the hall to get a pinch of snuff, leaving the study door open, and calling out the last words of his sentence as he went."

In spite of his natural activity and youthful strength, he had throughout life a clumsiness of movement. His hand was too unsteady and awkward to permit him to make usable drawings, and bothered him much in dissection of small animals and in sectioning plants. "When walking he had a fidgeting movement with his fingers, which he has described in

DARWIN'S STUDY

one of his books as the habit of an old man. When he sat he often took hold of one wrist with the other hand; he sat with his legs crossed, and from being so thin they could be crossed very far, as may be seen in one of the photographs. He had his chair, in the study and in the drawing-room, raised so as to be much higher than ordinary chairs; this was done because sitting on a low or even an ordinary chair caused him some discomfort." The family "used to laugh at him for making his tall drawing-room chair still higher by putting footstools on it, and then neutralizing the result by resting his feet on another chair."

Although his illness prevented Darwin from attending scientific meetings, or devoting much time to visits from other workers, he was a capable conversationist. His son says of him that when he was "excited with pleasant talk his whole manner was wonderfully bright and animated, and his face shared to the full in the general animation. His laugh was a free and sounding peal, like that of a man who gives himself sympathetically and with enjoyment to the person and the thing which have amused him. He often used some sort of gesture with his laugh, lifting up his hands or bringing one down with a slap. I think, generally speaking, he was given to gesture, and often used his hands in explaining anything ....in a way that seemed rather an aid to himself than to the listener. He did this on occasions when most people would illustrate their explanations by means of a rough pencil sketch.

"He wore dark clothes, of a loose and easy

fit. Of late years he gave up the tall hat even in London, and wore a soft black one in winter, and a straw hat in summer. His usual out-of-doors dress was a short cloak in which Elliot and Fry's photograph represents him leaning against the pillar of the verandah. Two peculiarities of his indoor dress were that he almost always wore a shawl over his shoulders, and that he had great loose cloth boots lined with fur which he could slip on over his indoor shoes. Like most delicate people he suffered from heat as well as from chilliness; it was as if he could not hit the balance between too hot and too cold; often a mental cause would make him too hot, so that he would take off his coat if anything went wrong in the course of his work."

Such, then was the appearance of the man who dominated the science of biology for three decades—tall, awkward, eager, and a little eccentric, but without pose or desire to be singled out from a crowd. His mental attitude was in keeping with his physical. Few men could do more, and call less attention to their achievements; few men so consistently belittled their own virtues and enlarged those of others. Darwin was one of those people who go to extremes in modesty; he refused to admit any special excellence in himself or his work, or to consider that he was above the run of scientific workers. Printed or spoken praise of the material set out in his books pleased him, but extravagant commendation of those books, or praise of himself rather than his work often caused him actual pain. Even recognition when in public distressed him; he

regretted that the abundance of magazine illustrations and photographs made his face known throughout England and Scotland. Even when he went to a water-cure establishment for a relief from illness he could not escape being gazed on, pointed at, and whispered of, as the great Mr. Darwin, who had done many fine things, but who nevertheless held the wicked belief that man was descended from apes and monkeys.

This modesty, coupled with an almost boundless generosity, made him almost a patron saint to those younger botanists and zoologists whose work lay in the same channels as his. He would learn of their work, and give them praise; he would ask for small favors and reproach himself for causing them so much trouble. Perhaps the next week he would take the work of one of these beginners, edit or even rewrite it, and then spend many of his precious work hours seeing the paper through the whole tedious process of publication. Of course, such acts put the enthusiasm of the younger men at the highest pitch, and gave them confidence in the value of the work they were doing. They would search their hardest for new facts to record for Darwin, and new specimens to send to him, even from such remote regions as South Africa and India. They felt that they were being of some use in the world of science, and they took long strides forward on the path that leads to achievement.

All this does not mean that Darwin was without critical ability, or inclined to accept everything as good. On the other hand he grasped

readily the defects of a piece of work, and resented unfair treatment at the hands of those who had little right to pass judgment. Thus when the Bishop of Oxford made a brilliant but intolerant address against evolution, and published an article containing the substance of his speech, Darwin wrote, "These very clever men think they can write a review with a very slight knowledge of the book reviewed or the subject in question"; another and favorable review he characterized as a well-done hash of his own words. Yet even when opposed to the ideas set forth in an article, he retained an even temper, and appreciated whatever of good there might be in the attack. Thus, in speaking of the Bishop's criticism he wrote a friend, "If you have not seen the last 'Quarterly,' do get it; the Bishop of Oxford has made capital fun of me and my grandfather."

This same freedom from prejudice, and ability to exercise his control over his ideas, even when in conflict with his own emotions is well shown in his attitude toward the anti-vivisectionists, who wished to prevent experimentation with living animals. Throughout all of his mature life Darwin had a horror of bloodshed; even a slight cut on the hand of one of his youngsters gave him pain. Naturally, the anti-vivisectionists sought to enlist his sympathies—an attempt that was capable of little but harm. To one friend Darwin wrote, in regard to the case, "It is a subject which makes me sick with horror, so I will not say another word about it, else I shall not sleep tonight." Yet he saw clearly the reasons why vivisection is necessary to the science of physiology, and

so he took a firm stand against those who would prevent scientists from experimenting with living animals. He was willing to conciliate, to speak as softly as possible in an argument, yet he would not confuse policy and prejudice. He could not fight for his stand because of the limitations imposed by illness, but he was not prevented from holding his own opinions.

The constant claim of ill health must have exerted a strong control over Darwin's personality. It prevented him from doing continuous work, yet work was essential for his health and mental balance. So for the sake of health all other activities were subordinated to work, while for the sake of the work which would make health possible, his physical condition was watched with endless care and anxiety.

In this connection we may return to a matter touched upon before—Darwin's loss of interest in the arts. It was a matter of great concern to him, and he made much of it in the autobiography. The passage is worth quoting, if only to show what the man thought of himself, and how he analyzed his condition.

"Up to the age of thirty, or beyond it," runs the autobiography, "poetry of many kinds, such as the works of Milton, Gray, Byron, Wordsworth, Coleridge and Shelley, gave me great pleasure, and even as a schoolboy I took intense delight in Shakespeare. . . . But now for many years I cannot endure to read a line of poetry; I have tried lately to read Shakespeare, and found it so intolerably dull that it nauseated me. I have also almost lost my taste

for pictures or music. . . . On the other hand, novels which are works of the imagination, though not of a very high order, have been for years a wonderful relief and pleasure to me, and I often bless all novelists. A surprising number have been read to me, and I like all if moderately good, and if they do not end unhappily—against which a law ought to be passed. A novel, according to my taste, does not come into the first class unless it contains some person whom one can thoroughly love, and if a pretty woman all the better.

". . . My mind seems to have become a kind of machine for the grinding of general laws out of large collections of facts, but why this should have caused the atrophy of that part of the brain alone, on which the higher tastes depend I cannot conceive. A man with a mind more highly organized or better constituted than mine would not, I suppose, have thus suffered; and if I had to live my life again, I would have made a rule to read some poetry and listen to some music at least once every week; for perhaps the parts of my brain now atrophied would thus have been kept active through use. The loss of these tastes is a loss of happiness, and may possibly be injurious to the intellect, and more probably to the moral character, by enfeebling the emotional part of our nature."

It is doubtful if a man ever gave a plainer diagnosis of his own failings than did Darwin in this passage. He does not reproach himself, nor does he make excuses. There are plenty of the latter to be made—the pressure of work,

the enthusiasm for things other than the arts, and the constant strain of ill health. As Poulton says, "Professor Bradley has spoken of the errors of interpretation due to the reading of Shakespeare with a slack imagination; and any literature worth calling literature demands effort on the part of the reader. Effort was the one thing Darwin could not give." The whole group of factors formed a vicious ring which was bound to exclude everything but work—a ring not very different from that which forms about the average graduate student in our modern colleges.* Perhaps had Darwin never given up literature it would have required less strain of him in later years, but that he did so was no sign, as he seemed to think, of a mind not highly organized.

A little farther on is another piece of self-analysis of equal candor, and perhaps even greater value as substantiating the claim that

---

*Few people realize the approximate illiteracy of the American graduate student, just as they fail to understand the similar failing among the undergraduate body. I well remember that, even as a freshman, I was astonished at the slight knowledge of literature and painting shown by graduate students at the University of Chicago. Not only are they ignorant of the better modern artists, but they do not even know the names of many leaders of the last century. In music they are nearly as bad; they form their judgments in accordance with the Victrola advertisements; such music as that of Russia, which calls for thought as well as feeling, is beyond most of them. Yet the student is matched by some, at least, of the professors. Just this year (1923) a department head in one of the country's foremost universities confused Eugene O'Neill, America's leading playwright, with Edgar Rice Burroughs, of "Tarzan" fame.—C. L. F.

Darwin, though a great naturalist, was not a genius in the proper sense of that term. He says:

I have no great quickness of apprehension or wit which is so remarkable in some clever men, for instance, Huxley. I am therefore a poor critic: a paper or book, when first read, generally excites my admiration, and it is only after considerable reflection that I perceive the weak points. My power to follow a long and purely abstract train of thought is very limited; and therefore I could never have succeeded with metaphysics or mathematics. My memory is extensive, yet hazy; it suffices to make me cautious by vaguely telling me that I have observed or read something opposed to the conclusion which I am drawing, or on the other hand in favor of it; and after a time I can generally recollect where to search for my authority. So poor in one sense is my memory, that I have never been able to remember more than a few days a single date or a line of poetry.

Some of my critics have said, "Oh, he is a good observer, but he has no power of reasoning!" I do not think that this can be true, for the "Origin of Species" is one long argument from the beginning to the end, and it has convinced not a few able men. No one could have written it without having some power of reasoning. I have a fair share of invention, and of common sense or judgment, such as every fairly successful lawyer or doctor must have, but not, I believe, in any higher degree.

On the favorable side of the balance, I think that I am superior to the common run of men in noticing things which easily escape attention, and in observing them carefully. My industry has been nearly as great as it could have been in the observation and collection of facts. What is far more important, my love of natural science has been steady and ardent.

That is Darwin's opinion of himself—an opinion so moderate, so obviously made without

regard to anyone but himself, and without prejudice on one side nor the other, that one must venture much to disagree with it. Those who will compare the accomplishments of the man with his estimate of himself will see that there is but slight discrepancy. As Carlyle admitted, Charles Darwin was honest and hard-working, and had an unbreakable allegiance to facts. He was not greatly gifted in some respects, and lost some of the gifts which he did possess in youth. On the other hand, he possessed in abundance certain talents which are scanty in the average run of men, and often nearly absent in those of genius. He was a tireless worker, with boundless enthusiasm for his labor. He was patient and fair, willing to see every side of every question, even though it caused delays that ran into years. He had a boundless curiosity along those lines in which he was interested, and an irrepressible desire to theorize. He believed in the efficiency of the human mind to solve great problems, yet he realized only too clearly the errors into which the human mind may fall when it becomes over-hasty in drawing conclusions. He worked carefully and honestly, without thought of the cheaper fame or the practical value of his discoveries. As he wrote his old teacher, Henslow, "I believe there exists, and I feel within me, an instinct for truth, or knowledge, or discovery, of something the same nature as the instinct of virtue, and that our having such an instinct is reason enough for scientific researches without any practical value ensuing from them." It was in this spirit, and with these abilities, that Charles Darwin labored, and it

was because of them that his labors endured. Comparisons with other men of his own or earlier days are pointless; it makes little difference whether Darwin was greater than Newton or Newton greater than Darwin. What does count is the fact that Darwin *was* great, and that his work has increased in value and benefit to mankind with the passing of years.